

**Abstract of the Disclosure**

A lateral flow, membrane-based assay device for detecting the presence or quantity of an analyte residing in a test sample is provided. The device utilizes phosphorescence to detect the signals generated by excited phosphorescent labels. The labels may have a long emission lifetime so that background interference from many sources, such as scattered light and autofluorescence, is practically eliminated during detection. In addition, the phosphorescent labels may be encapsulated within particles to shield the labels from quenchers, such as oxygen or water, which might disrupt the phosphorescent signal.